WE CLAIM

1. A method for determining at least one signal sequence characteristic of a signal sequence that propagates through at least three cascaded buffers, the method comprising the steps of:

providing status information reflecting a status of at least a third buffer and a second buffer of said at least three buffers; and

applying at least one fuzzy logic process to determine the at least one characteristic of the signal sequence, in response to the status information.

2. The method of claim 1 wherein at least one cascaded buffer reflects buffering properties of a network through which the signal sequence propagates.

3. The method of claim 2 wherein the network comprises a cellular network.

4. The method of claim 2 wherein the signal sequence propagates through the network at a packetized form.

5. The method of claim 1 wherein the signal sequence is a video stream.

6. The method of claim 1 wherein the three cascaded buffers comprise a client device buffer.

7. The method of claim 1 wherein the three cascaded buffers comprise a client device buffer and whereas at least one cascaded buffer reflects buffering properties of a network through which the signal sequence propagates.

8. The method of claim 1 wherein the signal sequence is associated with timing information.

9. The method of claim 8 wherein the timing information reflects signal sequence portion retrieval from at least one of the cascaded buffers.

10. The method of claim 1 wherein the signal sequence is preprocessed prior a provision to the second cascaded buffer and wherein the at least one signal sequence characteristic comprises preprocessing characteristic.

11. The method of claim 1 wherein the at least one signal sequence characteristic is a signal sequence target bit rate, a signal sequence compression ratio or a signal sequence encoding level.

12. The method of claim 1 wherein the status information reflects occupancy of at least a second buffer.

13. The method of claim 1 wherein the status information reflects timing information associated with signal sequence portions stored within a second buffer or a third buffer.

14. The method of claim 1 wherein the signal sequence is a packetized media stream.

15. The method of claim 14 wherein the packetized media stream propagates through a network modeled by a buffer.

16. The method of claim 14 wherein the packetized media stream is compressed or encoded prior the transmission towards the network.

17. The method of claim 14 wherein the packetized media stream is sent to a client device buffer.

18. The method of claim 17 wherein media stream packets stored at the client device buffer are retrieved according to timing information associated with these packets.

19. The method of claim 1 wherein the status information reflects a progress of signal sequence propagation across the cascaded buffers.

20. The method of claim 1 wherein the step of applying comprises:

receiving crisp input information representative of an occupancy of the second buffer; and

applying a fuzzy logic process to output crisp output information representative of a change in a retrieval rate out of the first buffer.

21. The method of claim 20 wherein the signal sequence is a packetized media stream and the retrieval rate out of the first buffer is a streaming rate of the packetized media stream.

22. The method of claim 1 wherein the step of applying comprises:

receiving crisp input information relating to signal sequence portions that were retrieved from the first buffer; and

applying a fuzzy logic process to output crisp output information representing an encoding level of the signal sequence.

23. The method of claim 1 wherein the step of applying comprises:

receiving crisp input information representative of an occupancy of the second buffer, of a retrieval rate of the second buffer and of an occupancy of the third buffer; and

applying a fuzzy logic process to provide crisp output information representative of a retrieval rate from the first buffer.

24. The method of claim 23 wherein the signal sequence is a packetized media stream and the retrieval rate out of the first buffer is a streaming rate of the packetized media stream.

25. The method of claim 1 wherein the step of applying comprises:

receiving crisp input information representative of timing associated with a retrieval of signal sequence portions from the third buffer; and

applying a fuzzy logic process to provide an encoding level of the signal sequence portions.

26. The method of claim 1 wherein the step of applying comprises:

receiving crisp information representative of a progress of the propagation of the signal sequence, and of an ability to propagate the signal sequence through the cascaded buffers; and

applying a fuzzy logic process to provide crisp output information reflecting timing information of signal sequence portions stored within the third buffer.

27. The method of claim 1 wherein the step of applying comprises:

receiving crisp input information reflecting timing information of signal sequence portions stored within the third buffer; and

applying a fuzzy logic process to provide crisp output information representative of a difference between a retrieval rate out of the first buffer and an encoding level of the signal sequence.

28. The method of claim 1 further comprising a preliminary step of analyzing the signal sequence and wherein the fuzzy logic process is also responsive to a result of the analysis.

29. The method of claim 28 wherein the signal sequence is a media stream and wherein the result of the analysis is an allocation of bits per media stream segment.

30. A method for determining multiple signal sequence characteristics of a signal sequence that propagates through at least two cascaded buffers, the method comprising the steps of:

providing status information reflecting a status of at least two cascaded buffers; and

applying at least one fuzzy logic process to determine multiple characteristics of the signal sequence, in response to the status information.

31. The method of claim 30 wherein at least one cascaded buffer reflects buffering properties of a network through which the signal sequence propagates.

32. The method of claim 30 wherein the network comprises a cellular network.

33. The method of claim 30 wherein the signal sequence propagates through the network at a packetized form.

34. The method of claim 30 wherein the signal sequence is a media stream.

35. The method of claim 30 wherein at least two cascaded buffers comprise a client device buffer.

36. The method of claim 30 wherein the at least two cascaded buffers comprise a client device buffer and whereas at least one cascaded buffer reflects buffering properties of a network through which the signal sequence propagates.

37. The method of claim 30 wherein the signal sequence is associated with timing information.

38. The method of claim 37 wherein the timing information reflects signal sequence portion retrieval from at least one of the cascaded buffers.

39. The method of claim 30 wherein the signal sequence is preprocessed prior a provision to the first cascaded buffer and wherein multiple signal sequence characteristics comprise preprocessing characteristic.

40. The method of claim 30 wherein the preprocessing process is a compression process or an encoding process.

41. The method of claim 30 wherein the multiple signal sequence characteristics comprise a signal sequence target bit rate.

42. The method of claim 30 wherein the multiple signal sequence characteristics comprise signal sequence compression ratio or a signal sequence encoding level.

43. The method of claim 30 wherein the status information reflects occupancy of at least a first cascaded buffer.

44. The method of claim 30 wherein the status information reflects timing information associated with signal sequence portions stored within a first buffer or within the second buffer.

45. The method of claim 30 wherein the signal sequence is a packetized media stream.

46. The method of claim 45 wherein the packetized media stream propagates through a network modeled by a cascaded buffer and wherein the packetized media stream is sent to a client device buffer.

47. The method of claim 45 wherein the packetized media stream is compressed or encoded prior the transmission towards the network.

48. The method of claim 30 wherein the status information reflects a progress of signal sequence propagation across the cascaded buffers.

49. The method of claim 30 wherein the step of applying comprises: receiving crisp input information representative of an occupancy of the first buffer; and applying a fuzzy logic process to output crisp output information representative of a change in a provision rate of the signal sequence into the first cascaded buffer.

50. The method of claim 30 wherein the signal sequence is a packetized media stream and the provision rate is a streaming rate of the packetized media stream.

51. The method of claim 30 wherein the step of applying comprises: receiving crisp input information relating to signal sequence portions that were provided to the first buffer; and applying a fuzzy logic process to output crisp output information representing an encoding level of the signal sequence.

52. The method of claim 30 wherein the step of applying comprises: receiving crisp input information representative of timing associated with a retrieval of signal sequence portions from the second buffer; and applying a fuzzy logic process to provide an encoding level of the signal sequence portions.

53. The method of claim 30 wherein the step of applying comprises: receiving crisp information representative of a progress of the propagation of the signal sequence, and of an ability to propagate the signal sequence through the cascaded buffers; and applying a fuzzy logic process to provide crisp output information reflecting timing information of signal sequence portions stored within the second buffer.

54. The method of claim 30 wherein the step of applying comprises: receiving crisp input information reflecting timing information of signal sequence portions stored within the second buffer; and applying a fuzzy logic process to provide crisp output information representative of a difference between a provision rate to the first buffer and an encoding level of the signal sequence.

55. The method of claim 30 further comprising a preliminary step of analyzing the signal sequence.

56. The method of claim 55 wherein the fuzzy logic process is also responsive to a result of the analysis.

57. The method of claim 55 wherein the signal sequence is a media stream.

58. The method of claim 55 wherein the result of the analysis is an allocation of bits per media stream segment.

59. The method of claim 30 wherein the fuzzy logic process is also responsive to network policy rules.

60. The method of claim 30 wherein the fuzzy logic process is updated in response to previously determined characteristics.

61. The method of claim 60 wherein the update is implemented by neural networks.

62. The method of claim 30 wherein at least one characteristic is a transport layer characteristic and whereas at least one characteristic is an application layer characteristic.

63. A controller for determining at least one signal sequence characteristic of a signal sequence that propagates through at least three cascaded buffers, the controller comprises:

a fuzzifying block, for receiving status information reflecting a status of at least a third buffer and a second buffer of said at least three buffers, and to fuzzify the status information to provide fuzzified status information;

a fuzzy decision making block, coupled between the fuzzifying block and a de-fuzzifying block, for processing the fuzzified status information to provide a fuzzified output representative of at least one signal sequence characteristic of the signal sequence; and

a de-fuzzifying block, for de-fuzzifying the fuzzified output.

64. The controller of claim 63 wherein at least one cascaded buffer reflects buffering properties of a network through which the signal sequence propagates.

65. The controller of claim 63 wherein the network comprises a cellular network.

66. The controller of claim 63 wherein the three cascaded buffers comprise a client device buffer.

67. The controller of claim 63 wherein the signal sequence is associated with timing information reflecting signal sequence portion retrieval from at least one of the cascaded buffers.

68. The controller of claim 63 wherein the signal sequence is preprocessed prior a provision to the second cascaded buffer and wherein the at least one signal sequence characteristic comprises preprocessing characteristic.

69. The controller of claim 63 wherein the fuzzifying block is adapted to receive crisp input information representative of an occupancy of the second buffer and to provide fuzzified status information; and wherein the fuzzy decision block receives said fuzzified status information and provides a fuzzified output signal representative of a change in a retrieval rate out of the first buffer.

70. The controller of claim 63 wherein the fuzzifying block is adapted to receive crisp input information relating to signal sequence portions that were retrieved from the first buffer and to provide fuzzified status information; and wherein the fuzzy decision block receives said fuzzified status information and provides a fuzzified output signal representing an encoding level of the signal sequence.

71. The controller of claim 63 wherein the fuzzifying block is adapted to receive crisp input information representative of timing associated with a retrieval of signal sequence portions from the third buffer and to provide fuzzified status information; and wherein the fuzzy decision block receives said fuzzified status information and provides a fuzzified output signal representative of an encoding level of the signal sequence portions.

72. The controller of claim 63 wherein the fuzzifying block is adapted to receive crisp input information representative of a progress of the propagation of the signal sequence, and of an ability to propagate the signal sequence through the cascaded buffers and to provide fuzzified status information; and wherein the fuzzy decision block receives said fuzzified status information and provides a fuzzified output signal reflecting timing information of signal sequence portions stored within the third buffer.

73. The controller of claim 63 wherein the fuzzifying block is adapted to receive crisp input information reflecting timing information of signal sequence portions stored within the third buffer and to provide fuzzified status information; and wherein the fuzzy decision block receives said fuzzified status information and provides a fuzzified output signal representative of a difference between a retrieval rate out of the first buffer and an encoding level of the signal sequence.

74. A controller for determining multiple signal sequence characteristic of a signal sequence that propagates through at least two cascaded buffers, the controller comprises:

a fuzzifying block, for receiving status information reflecting a status of at least a first and second buffers of said at least two buffers, and to fuzzify the status information to provide fuzzified status information;

a fuzzy decision making block, coupled between the fuzzifying block and a de-fuzzifying block, for processing the fuzzified status information to provide a fuzzified output representative of multiple signal sequence characteristics of the signal sequence; and

a de-fuzzifying block, for de-fuzzifying the fuzzified output.

75. The controller of claim 74 wherein at least one cascaded buffer reflects buffering properties of a network through which the signal sequence propagates.

76. The controller of claim 75 wherein the at least two cascaded buffers comprise a client device buffer.

77. The controller of claim 74 wherein the signal sequence is associated with timing information.

78. The controller of claim 77 wherein the timing information reflects signal sequence portion retrieval from at least one of the cascaded buffers.

79. The controller of claim 77 wherein the timing information reflects signal sequence portion retrieval from at least two cascaded buffers.

80. The controller of claim 77 wherein the signal sequence is preprocessed prior a provision to the first cascaded buffer.

81. The controller of claim 77 wherein the multiple signal sequence characteristics comprise preprocessing characteristic.

82. A system for transmitting a signal sequence towards an intermediate buffer towards a target buffer, the system comprises:

a status information providing means, for providing status information reflecting a status of at least the target buffer and the intermediate buffer;

a controller, coupled to the status information providing means, for applying at least one fuzzy logic process to determine at least one signal sequence characteristic, in response to the status information; and

signal sequence provider, for transmitting at least a signal sequence portion in response to the at least one signal sequence characteristic.